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The Democratic Landscape: Envisioning Democracy Through Aldo Leopold's Land Ethic

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The Democratic Landscape: Envisioning Democracy Through Aldo Leopold's Land Ethic

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Introduction

> The first man, having enclosed a piece of land, thought of saying 'This is mine' and found people simple enough to believe him, was the true founder of society… how much misery and horror the human race would have been spared if someone had pulled up the stakes and filled in the ditch and cried out to his fellow men: 'Beware of listening to this imposter. You are lost if you forget that the fruits of the earth belong to everyone and that the earth itself belongs to no one!'[1]

The realities of human and nature interconnectivity demand a reevaluation of what American democracy looks like. Americans have a moral obligation to protect and preserve "those aspects of life and liberty uniquely and irrevocably grounded in the experience of nature."[2] If humans are to sustain themselves and provide for future generations, democracy's reach must extend beyond the human sphere. This paper expands on the idea that democracy, if viewed through Aldo Leopold's land ethic, which "enlarges the boundaries of community to include soils, waters, plants, and animals, or collectively, the land," will help restore the natural and civilized landscapes by addressing the essential connection between land and democratic rights and responsibilities.[3] In a truly democratic landscape, the inalienable rights of life and liberty would be extended to all members of the land community.

Since its founding, the American democratic system has perpetuated the idea that land is a commodity to be occupied, labored upon and cultivated. To transform nature's bounty into something salable has been the hallmark of America's capitalist democratic society. Progress and success are still measured by the ability "to take the greatest possible amount of natural resources, process [them], put them through the consumer economy as quickly as possible, then on to the waste heap.[4]

But this process has not served America well. Despite the consequences, Americans still allow an eco-authoritarian attitude to govern their actions toward nature. With little consideration for the effects those actions have on other parts of the biotic world, the divide between humans and nature has drastically expanded. Now more than ever, humans are witnessing the devastating effects of individualistic actions toward the land that have neglected the interdependence of the greater biotic community. Natural resources are being depleted at an alarming rate and the effects of a desecrated landscape can be felt far and wide.

The American right to private landownership has greatly contributed to this current ecological state. Although initially constrained by common law principles that landowners "should cause no harm… to immediate neighbors or to the surrounding region," property rights have varied and changed since the founding fathers first endorsed the right for all Americans to acquire land.[5] Eric Freyfogle, professor of natural resources, property and land use law, asserts that landownership has become less concerned with "moral… and natural-rights reasoning" than with "the legal powers held by [the property owners]."[6] He argues that the concept of private property is "an abstract human construct… typically defined without regard for the land's natural features," but that nature is an "interconnected whole," and "even a seemingly slight action on one tract of land can trigger far-spreading ecological ripples."[7] What one landowner does on his or her private property can have devastating effects on nearby natural as well as privately owned lands.

Americans perceive property ownership as fundamental to their idea of liberty and freedom. In their book, *The Gardens of Democracy—A New American Story of Citizenship, the Economy, and the Role of Government*, Eric Liu and Nick Hanauer argue that many

Americans still maintain a "'don't tread on me' idea of citizenship' that may have been tolerable in 1775 when the country had 3 million largely agrarian inhabitants" but is today both "naïve and… destructive in a diverse, interdependent, largely urban nation of over 300 million."[8] Landownership tends to equate more with power than responsibility, as the assertion of individual power is typically antithetical to the holistic necessity of the commons. It is for this reason that the definition of democracy and democratic citizenship must be broadened to include not just humans, but also "the soils, waters, plants, and animals, or collectively" what Aldo Leopold called "the land."[9]

Aldo Leopold was one of the most prolific writers and thinkers of the modern conservation movement. His land ethic philosophy is perhaps the greatest argument supporting the link between democracy and the environment. Leopold's personal attitude toward the natural world evolved as he gained a greater knowledge and understanding of the interconnectedness of humans, their actions, and nature. The concepts he presented in his groundbreaking essay, "The Land Ethic," were unconventional for the 1930s and '40s as they challenged the Abrahamic belief that land was property and available solely for man's use. Through a life-long evolution of philosophic and scientific thought and his own participation as an equal member of the land community, Leopold arrived at the conclusion that an ethical shift in man's attitude toward land was necessary for its recovery and continued health. Leopold believed that participation was key to fostering an appreciation of the land itself, as well as man's sense of responsibility to the land.

In order to restore the natural and civil landscapes, humans must recognize their interconnectivity and interdependence with the land; but they must also acknowledge the fundamental connection between land and democratic rights and responsibilities. Democracy

is not something that simply happens *to* people; for it to truly be efficacious, it requires active participation and a willing concession toward that which benefits all members of the land community.

The Land Ethic's Role in Democracy

What English colonists saw upon their arrival in America in the 17th century was not only vast wilderness, but also unlimited opportunity. In England, land was scarce, as were many of its natural resources. Most colonists, seeking economic independence, judged the American landscape for its saleable commodities—what of it could be sold, or used to produce something sellable to Europe. Timber, animal skins and fur, medicinal plants, fruits and vegetables, and fish were among the many products that the land could supply. But despite the necessity of and dependence upon nature for these products, writes environmental historian William Cronon, "little sense of ecological relationships emerges from such a list."[1] He argues that their view of land "in terms of commodities" necessitated that they "treat members of an ecosystem as isolated and extractable units."[2]

As the colonists settled in the New World, their activities with regard to land were shaped by "the Old World tradition that nature existed solely for the purpose of supporting human needs."[3] The land, and by extension its plant and animal communities, were to be manipulated and reorganized as necessary to facilitate its profitability. The colonists believed that "wilderness was not only limitless, but also that, once tamed, it would continually provide for their… needs."[4] This idea was perpetuated by a fundamental belief that it was their "God-given right to inhabit the continent" and that divine providence included the right

to "subdue both nature and any Native Americans they encountered, all for the benefit of Christian society."[5]

The presence of Native Americans on the land presented unique challenges to what the colonists saw as their predetermined right to the land. The colonists observed "two ways of owning the land, one natural and one civil."[6] Natural ownership existed as all men holding the earth in common, whereas the civil ownership that superseded it resulted when land was enclosed and used (to raise crops or cattle, for example). As hunter-gatherers, Native Americans were primarily mobile, and so could only claim a natural (as opposed to a civil) right to the land. Thus, most of the country was, for the colonists, "open to anyone that could and would improve it."[7] The colonists used this to justify their occupation and expropriation of the land.[8] Moreover, Native American populations were being decimated by exposure to European diseases, providing an easier defense for the taking of their land; by eliminating the Native Americans, God was "preparing the land for his chosen people." This signified a "direct conveyance of property rights" as part of God's providence.[9]

With "plenty of fertile soil" available, America quickly became Britain's surrogate farmland; the colonists drained, filled, clear-cut, and tilled their way across the countryside—and ultimately toward economic self-sufficiency.[10] As tensions between the colonists and England escalated, self-sufficiency became increasingly important, and colonists began to equate "home production and agriculture with the upholding of domestic liberty."[11] Agriculture and farming were seen as "political acts," necessary for their "freedom and independence."[12] The seemingly infinite availability of land provided the foundation for this burgeoning nation's identity.

By 1786, nine out of ten Americans lived on farms.[13] The majority of the founding fathers, too, were agrarians first—over half of the 55 delegates to the Constitutional Convention were farmers or planters. Most saw agriculture and politics as "one endeavor," and many believed that a country driven by agricultural values would not be susceptible to the "corruption, decadence and tyranny that had destroyed ancient republics and Europe."[14] George Washington saw America's future as "a country peopled... by farmers—an agrarian society that would be industrious and happy."[15] He believed that the "cultivated soil" was key to "the country's wealth and independence and was steadfast in his belief that America's future would be found in the wilderness beyond the colonies.[16]

Thomas Jefferson, too, conceived of "a society rooted in the soil."[17] He sensed "that nature and nature-ownership had much to do with American democracy" and believed that land and land ownership "could simultaneously free people from their susceptibility of vice *and* augment their bank accounts."[18] Jefferson envisioned a country populated "by the common man on small farms that reached across the country."[19] He supported a democratic system of land use whereby land would be "given or sold cheaply in small but sustainable allotments to independent farmers."[20] Land was central to Jefferson's ideas of democracy, and ownership was key to individual independence.

But Jefferson's "agrarian dream… was largely a myth" as the nation's economy soon became less contingent "upon the independent small farmer" and more "upon large-scale, soil-impoverishing tobacco plantations and on the welted backs of African slaves."[21] Jefferson attributed this to "the restless striving of his countrymen [and] their get-ahead, get-rich, rise-in-the-world ambitions."[22] His apparent contradictory opinions "reflect[ed] American economic realities."[23]

However naïve, Jefferson believed these inequities could be resolved by westward expansion. He was convinced that America's power lay in its size, and during his presidency, it became his mission to expand the size of the country. Expansion was necessary for America to remain powerful and virtuous. In 1787, in a letter to James Madison, Jefferson wrote, "I think our governments will remain virtuous for many centuries; as long as they are chiefly agricultural; and this will be as long as there shall be vacant lands in any part of America."[24] With the acquisition of the Louisiana Territory from France in 1803, America's "empire of liberty" doubled in size, providing land and resources for the growing population and securing virtue and liberty for "millions yet unborn."[25]

The early conceptions of American democracy reflected the ideologies of English philosopher John Locke and Genevan philosopher Jean Jacques Rousseau. Locke, in particular, believed in a "pre-social, pre-government condition in which all people were equal and free" and "private property was a natural right" of free individuals.[26] He argued that the "great and chief end… of men's uniting into commonwealths and putting themselves under government [was] the preservation of… property."[27] Thus, the natural right of property formed the basis of governance and took precedence over the impositions of government. But the American forefathers challenged this notion, arguing that private property was, in fact, a "social convention" in which the public held "full power to limit the quantity and uses of it."[28] Both Benjamin Franklin and Jefferson reasoned that individual land acquisition should be limited to that which is necessary for "subsistence living" only and that it should be "freely available" to all.[29] Further, Jefferson was openly concerned that private property rights could not remain fair as the country continued to increase in size and population.[30]

Property rights were, according to Jefferson, rights of opportunity that required responsible action on the part of the owner.[31] For this reason, and for fear of misinterpretation, he suggested a change in Locke's phrasing of "life, liberty and property" to "life, liberty and the pursuit of happiness" when framing the U.S. Constitution. He felt strongly that the earth had been given to man "to labor and live on," but wanted to prevent misappropriation, particularly because the right to acquire property was one of the main reasons the colonists came to the New World.[32] John Adams agreed, stating that equal liberty for all and public virtue were only possible if "every member of society" had access to land.[33] But this "right" was nearly impossible to ensure as more land was acquired by private owners and without restrictions on how much land a private owner could purchase.[34]

For the founding fathers, property ownership was a right that all were afforded in return for their participation in society and its governance. Land use regulations were designed with the public interest in mind in an attempt to ensure that the effects of one landowner's actions would not compromise the health and welfare of other citizens or their land.[35] As well, unused land was afforded fewer protections than cultivated land, encouraging landowners to work the land or risk it being appropriated by federal and state governments for roadways and other public needs; it could also be seized if private land near a public resource (e.g. a river) was used in a way that ignored the public interest.[36]

David Orr, professor of environmental studies and politics, writes, "The U.S. Constitution… reflects the opinions that originated in the Enlightenment era"—namely "that ordinary people… are capable of self-governance."[37] In 1789, the founding fathers adopted Locke's common law principle of "sic utere tuo ut alienum non laedas."[38] Private landowners, so long as they complied with this guideline, had total control over their land as

well the government's protection against outside forces who sought to challenge the landowner's authority. At the time, this principle was sufficient in shaping the rules of property ownership. But much has changed since the framers first envisioned this "common good" system of property ownership. The personal liberty and self-determination that property ownership afforded American citizens ultimately "encouraged people to think of private property in new ways."[39]

Private property, while seen by many as representative of American democracy, has actually worked against not only democratic ideals, but also individual and collective well-being. Although it increases the individual's control over the land, it simultaneously decreases the liberty of all those who are precluded from access to and influence over the land.[40] Further, private property tends to be partitioned arbitrarily, ignoring topography and natural delineations (such as rivers, mountains, wetlands, etc.)[41] Private and political boundaries conceived by man are inconsequential to natural elements like flowing water, wind, plants and wildlife.[42]

America's narrative has long since drawn from the economic opportunities and personal liberties that came with property ownership.[43] Americans "more than any other people on earth" have not only upheld but "cherished" the institution of private property ownership.[44] Mere property ownership was meaningless until "labor was added" to the land; then and only then did private property begin to have real value.[45] Labor is what transformed the "raw land" into a functional and productive landscape; it is also what brought forth property rights to the colonists.[46]

In 1831, upon visiting America, political philosopher and historian Alexis de Tocqueville concluded that the key to the American consciousness was what he described as

the "'march' of the nation across the wilds, 'draining swamps, turning the courses of rivers, peopling solitudes, and subduing nature.'"[47] In *Journey to America*, Tocqueville's travel diary from his 1831 visit, he wrote: "To break through almost impenetrable forests, to cross deep rivers, to brave pestilential marshes… those are exertions that the American readily contemplates, if it is a question of earning a guinea; for that is the point."[48] The western expansion of America meant an endless supply of resources for settlers—and America's democratic system promised full access to those resources. But as Tocqueville noted, the westward march of the settlers was "turn[ing] the whole order of nature upside down."[49]

Nonetheless, Americans continued their march toward the Pacific Ocean, fueled by "Manifest Destiny," a concept conceived of by Americans to justify their attempt at "possess[ing] the entire continent."[50] As determined by "the will of God," westward expansion sought to "fill the empty spaces on the map" and "convert [them] from [their] savage state into a land that could enjoy the blessings of Christian civilization."[51] Their crusade was encouraged by national land grant programs like the Homestead Act of 1862, in which settlers were given 160 acres of federal land in exchange for agreeing to "live on and develop [it] for five years" with the goal of improving it from wilderness to farmland.[52]

The opening of the western American frontier, coinciding with the Industrial and Market Revolutions of the 19th century, lead to radical changes in the way men labored on their land. With industrialization came a growing disconnect between man and nature. New inventions and ideas provided man with more and greater opportunities to control and manipulate the natural world. Americans in particular began to reject the principles of self-subsistence in exchange for a dependency on mechanized processes, specialization and capitalist ideals that would further alienate them from their origins and from each other.

Rural populations migrated to cities in search of employment, leaving their agrarian roots far behind.

The urbanization of society was not without its environmental costs: air and water pollution, deforestation, collapsing ecosystems and nearly decimated wildlife populations, to name a few. Some argue that industrialization and specialization were based on "the principle of violence toward everything on which [they] depend [such as] nature, human communities, traditional agricultures."[53] Man's "dependence on… environmental processes" was all but eliminated as a result, as was the individual's "need for comprehensive knowledge of place and complex social and ecological thinking."[54] The "cultural shift" that came out of industrialization—specifically its bearing on what the "American frontier" represented—"persuaded [early Americans] that [they] were *in*dependent rather than *inter*dependent."[55]

For an agrarian nation of less than 3 million people[56], the Constitution served well as an instrument of common law, a social contract that provided the essential protections for "life, liberty and the pursuit of happiness." But as the population and size of America grew exponentially, its governance did not kept pace, particularly with regard to its treatment and protection of land. The "unsuspecting stewardship" of the founding fathers "does not serve today's circumstances."[57] Rather, it is considered by many of today's scholars to be "naïve," "unsophisticated" and "insufficiently democratic."[58] Orr maintains that the U.S. Constitution, being "purely anthropocentric," tends to ignore those very things that are the foundation of both the life and liberty of Americans.[59]

The Constitution, and subsequently state and local laws, offer protections and sanctions against what humans have designated as harmful to humans, but no provisions of protection have been granted for other members of the land community.[60] Nor does it provide

or protect the "ecological prerequisites for life, liberty, and property."[61] Throughout the Constitution, there is no mention of "land" or "our rights and responsibilities pertaining thereto."[62] At the time of the original Constitutional Convention, the natural world was seen "as stable and enduring," such that "government involvement in land use issues was not necessary."[63] The framers could not have anticipated the devastation that modern America would inflict upon itself; however, Orr writes, it is unlikely that they would have wanted "to preserve every letter of the Constitution of 1788 while permitting the destruction of the very ground on which the document and life itself depend."[64]

True democracy implies the opportunity for equal participation of all citizens, as members of the democratic states, in the decisions that determine their governance. The concept of citizenship, however, recognizes the interdependence of all members.[65] Even as "private citizens," Americans have a participatory role in the governance of themselves—and by extension, the land. By definition, democracy "suggests the idea of a polis whose members are coequal in their moral freedom and in their active engagement in political self-government, who share the burdens and the joys of public life."[66] Taken further, the democratic citizen also shares in the consequences of all actions undertaken within the democratic framework. This extends beyond personal and political liberties to encompass those actions taken upon and within the natural world.

Although the Constitution does not include explicit provisions for land use and care, it does guarantee the security of liberty not only to "ourselves," but also to "our posterity." That security of liberty to future generations is contingent upon immediate action. It is arguable that, under the protection of the Constitution, "no generation has a license to diminish the unalienable rights of subsequent generations by changing the biogeochemical

systems of Earth or impairing the stability, integrity, and beauty of biotic systems."[67] Americans are threatening the security of liberty for their posterity by continuing the self-motivated gross misuse of fellow land members, and this is "a form of tyranny stretching across generations."[68] If the history of land use is closely examined, it will reveal that the American economy has "for a long time… thrive[d] on undermining its own foundations."[69] Orr concludes that "no good argument can be made for the right of one generation to deprive subsequent generations of the ecological requisites necessary" for the constitutional right to life, liberty and the pursuit of happiness.[70]

It is without question that the Constitution was an exclusive document. At the time of its creation, there were no provisions for anyone other than free, white males; women, African Americans and Native Americans were excluded.[71] But, for the most part, those exclusions have since been rectified. The document has been repeatedly amended to reflect the changing moral code of American and global society. Similarly, it is a tenable argument that the Constitution can and should be amended to include all members of what Aldo Leopold deemed the land community. In his groundbreaking essay, "The Land Ethic," Leopold argued that humans are "plain members" of the land community, equal constituents along with the soil, water, plants and animals. (How Leopold came to this radical conclusion will be further explored in Section II, "The Evolution of the Land Ethic.")

But mere constitutional protections are not sufficient to accomplish what is necessary to secure the life and liberty of both present and future generations of these "plain members" of the land community. A broader definition of not only democracy, but also democratic citizenship, is imperative. This expanded definition of democracy should include representation from and for the "non-human" spheres.[72] Its efficacy should not be judged

solely on its ability to provide for the human domain, but also on its ability to protect the ecological integrity of the land.[73] Rather than a government by and for the people, it should be a "government of, by, and for nature, which includes people."[74]

In the ecological order, the individual is irrelevant. Nature functions as "a closely organized cooperative commonwealth of plants and animals."[75] Participation from all members of the biotic community is a condition of survival. Similarly, "democratic freedom, equality, and community" as well as "the ecological well-being of the planet" cannot be realized separately.[76] The more humans gravitate toward individualism, the more vulnerable they become to the influences and activities of others. This individualistic ideal that Americans have clung to for over 250 years contradicts the intrinsic interconnectedness and interdependence of all members of the land community.

Modern democracy remains dualistic, whereby man and nature are manifestly separate.[77] Americans, in particular, "tend to adopt the 'exclusionary principle' in which they see themselves as separate from… nature."[78] American democracy, itself, promotes the concept of the "private citizen," one who is free to pursue individual inclinations. Under the auspices of "democracy," Americans maintain that, as private citizens, it is their right to own land and thus do with it as they please. The prevailing idea is that democracy is "most functional when individuals and factions pursue their own self-interest aggressively."[79] But self-interest and selfishness have been conflated; true self-interest, when considered through the ecological framework of existence, is "mutual interest," that is to say that self-motivated actions affect more than the self.[80]

The concept of "private citizen" has become somewhat of an oxymoron.[81] In the modern democracy, "private citizen" must give way to "public citizen," i.e. participatory and

inclusive. To be a citizen is to be an engaged member of not only the human community, but the land community as well. As Leopold suggested, "an ecological comprehension of our own self-interest" would reveal that human welfare is "inextricably tied to the health of the land community."[82] Understanding that it is nature that sustains all life (humans included), humans must learn to conceive of themselves as an integral part of nature and thus consider that they have a moral obligation to protect that which sustains them.

The current environmental ethic, if Americans even have one, is not governed by a collective responsibility to the land; rather, it is determined by an economic self-interest that assumes private privileges trump the needs of a community. So long as humans insist on believing that they exist in isolation from nature, and that their choices have no bearing on the liberties of any other member of the land community, they will persist in evading true democracy. Nature and all its components cannot continue to be viewed as separate from the human sphere. Nature is a community—one in which humans are effective participants, both positively and negatively, and whether they like it or not. Being a member of the land community is not a choice for humans. How they act within that community is.

As Leopold posited, humans "can be ethical only in relation to something [they] can see, feel, understand, love, or otherwise have faith in."[83] For Leopold, an ethic required a self-imposed limitation on one's freedom of action. Ethical behavior toward land requires deliberate choices that reflect and support not the individual, but the collective good. In "The Land Ethic," Leopold argued that the "soils, waters, plants, and animals" are "members of the biotic community, and if… its stability depends on its integrity, they are entitled to continuance."[84] But he also recognized that continuance, which is largely contingent upon the decisions of humans, required a new way of viewing the land, one that is ecological and not

economic. He wrote, "The biota is beautiful collectively, but only a few of its parts are useful in the sense of yielding a profit to the landowner."[85] For people to truly embrace the Land Ethic, a new aesthetic must be conceived of, whereby the "beauty" of the land is judged not by its "picturesque qualities," but by "the integrity of… its ecological processes."[86]

When humans can begin to see the landscape in terms of its ecological function as a whole biotic community in which they are but one part, they can then begin to act in accordance with what is right for the whole. And when their actions are governed by an ethical motivation toward the good of the whole, then and only then will they be engaging in a true democracy. For Leopold, a participatory relationship with the land is the key, providing requisite opportunities to reconnect humans with their fellow land members and ultimately fostering a true democratic citizenship.

The Evolution of the Land Ethic

From a very early age, Leopold was exposed to the natural world, fostering in him an appreciation for and a desire to study and understand it. Nature was ingrained in his character; having and building upon a connection with the natural world was a family tradition handed down for generations, and one that truly culminated in Aldo's life. As biographer Curt Meine notes in *Aldo Leopold, His Life and Work*, "Leopold's interest in the natural world came easily, an all but inevitable consequence of his family and environment."[1]

Charles Starker, Leopold's maternal grandfather, was a landscape engineer, an amateur naturalist and an outspoken advocate for parks and natural areas. He designed a city park "to flow along the natural contours of the land" using native vegetation rather than the more commonly used ornamental plants.[2] Much like Leopold would experience years later on his own Sauk County property, Starker purchased several "ruined acres" and enlisted his

family to help him "transform the limestone plateau into a proper yard and garden" by planting "pines, spruce, oaks, maple, apple and plum trees, roses, tulips, lilies, crocuses and bloodroot."[3] They called it Lug-ins-land or "Looking to the Land." The model that was the ongoing restoration and beautification of Lug-ins-land would become an institution in the Leopold heritage.[4]

Starker fostered much more than gardening skills in Leopold. With his grandfather's guidance, Leopold developed his observation, writing and rendering skills, which he employed initially as an avid bird-watcher, documenting and sketching in great detail the many birds he identified. Leopold's enthusiasm for the natural world grew quickly under the auspices of Starker. It was said of Starker that "...he could not only design a bridge or building, but just as easily build it, plant the gardens around it, and paint the scene in watercolors."[5] Charles Starker died in 1900 when Leopold was only 13 years old, but in that short time, he would inspire in Leopold a lifetime of dedication and responsibility to wilderness.

Leopold's father also played an essential role in his personal evolution as a naturalist. Carl Leopold exposed his son at an early age to gardening, hunting, and long walks in the woods. These walks, or "tramps," became tutorials in the natural sciences. Leopold's classmate, Edwin Hunger, often accompanied the family. In his memoirs, Hunger refers to Carl Leopold's lessons as "lectures on the move" whereby he taught his children "about the trees and bushes, the birds and swamp animals, and even how to make a fire and afterward to dispose of it. In it all there was much about the woods in general and how they should be managed and preserved."[6]

Upon his death in 1914, Carl Leopold was celebrated by his son as "a pioneer in sportsmanship."[7] His conduct in the field reflected a personal code of ethics—one that he would pass on to his son. Recognizing an imminent decline in game populations due to a lack of restrictions on how much a hunter could take, Carl Leopold adjusted his hunting technique accordingly.[8] He would not "hunt species whose numbers were dwindling" and would not hunt in the spring "since species populations were especially vulnerable before the young were born."[9] He even set his own personal bag limits.[10] As a result, Leopold's first hunting experiences with his father were early lessons in conservation, and from them, he gained a deep appreciation for the natural world. More importantly, he acquired an understanding of nature's delicate balance. The lessons Leopold's father taught him transcended the physical world; they formed the essence of Leopold's being and inspired him in ways he could not yet begin to conceive.

Leopold spent much of his childhood tramping in the woods or along the Mississippi River in his hometown of Burlington, Iowa. Alone or with his family, Leopold explored the countryside, observing and documenting the smallest of details. His diaries, dating back to 1899, were filled with intricate drawings of plants, animals, still lifes, and landscapes, as well as notes detailing the cyclic and seasonal phenomena of the natural world.[11] He was most intrigued by birds, and kept painstaking records of the annual arrivals and departures of migrating species, and meticulous notes on their varying behaviors.[12]

In 1904, Leopold transferred to the Lawrenceville School, an esteemed preparatory school in New Jersey. He was an excellent student, but his true talent became evident in the woods and fields surrounding the school. Almost immediately upon his arrival, Leopold "was off on daily 'tramps' into the winter countryside, and soon after was being introduced as 'the

naturalist.'"[13] At Lawrenceville, he developed his interest in ornithology, botany, meteorology and, ultimately, forestry. His 1904 essay, "The Maintenance of Forests," written when he was seventeen, was the first sign of his growing insight into the problems—both current and potential—of what he referred to as "lumbering," a term that should refer to the collection of a forest crop but actually indicates the "destruction of the forest crop."[14] Even before pursuing forestry as a career, Leopold recognized that "careless and unnecessary methods in handling forest lands" were contributing to the "fields of destruction."[15] He noted how fires raged on timbered lands, consuming soils, and eroding slopes to the point where little vegetation could grow: "Where was yesterday a bountiful land, is today a barren, lifeless waste, destined so to remain for years to come or perhaps forever."[16]

An early and constant exposure to the natural world cultivated Leopold's appreciation for nature and wilderness. Nature was certainly a part of his heritage, but that love and tradition would only begin to foster what would become Aldo's passion and the basis for his life's dedication to conservation.

Leopold's youth coincided with a budding national conservation movement. East of the Mississippi, forests were all but depleted and loggers were heading west. Public awareness of conservation issues was increasing, particularly due to the efforts of President Theodore Roosevelt, a known outdoorsman and conservationist, and Gifford Pinchot, Roosevelt's close friend and advisor. Concerned citizens, including Aldo's father, were calling for laws that would protect forests. Proponents such as author and activist John Muir and botanist Charles Sprague Sargent were speaking out for preservation, while Roosevelt and Pinchot were employing a utilitarian approach to forest management. As a result of his efforts, Pinchot was selected to oversee the U.S. Division of Forestry; his family

subsequently donated money to Yale University for the creation of a forestry school.[17] Pinchot was specifically responsible for bringing the issue of forestry management to the public and political arena. His approach to forest management was one of wise use—but man's use, nonetheless. He believed that the forests were "for the purpose of preserving a perpetual supply of timber for home industries, preventing destruction of the forest cover which regulates the flow of streams, and protecting local industries from unfair competition in the use of forest and range."[18]

This utilitarian position came into conflict with the preservationist view that the forest existed for the forest, itself, and for the plants and animals that lived in and utilized it. Preservationists also recognized the forest as an aesthetic and restorative asset for man. The foremost preservationist at this time, and one that Leopold was very familiar with, was Muir. For Muir, there was no better use for a tree or a mountain valley than to let it be.[19] His firm support of protective forest management was highlighted in his 1897 article for the *Atlantic Monthly*, "The American Forests":

> "…many of nature's five hundred kinds of wild trees had to make way for orchards and cornfields. In the settlement and civilization of the country, bread more than timber or beauty was wanted; and in the blindness of hunger, the early settlers, claiming Heaven as their guide, regarded God's trees as only a larger kind of pernicious weeds, extremely hard to get rid of… Every other civilized nation in the world has been compelled to care for its forests, and so must we if waste and destruction are not to go on to the bitter end."[20]

The creation of the Yale Forest School and the United States Forest Service appealed to Leopold. An avid reader, Leopold had witnessed a growing concern over the misuse of land in the writings of George Perkins Marsh, Henry David Thoreau, John Burroughs, John Muir and many other naturalists.[21] Leopold's father, too, "was well aware of the forest situation," as his occupation of building furniture directly relied on the timber industry.[22] His

understanding of the need to correct the rampant waste and misuse directly influenced Aldo's decision to pursue a career in forestry.[23]

In 1905, in preparation for the Forest School's graduate program, Leopold began his undergraduate studies at the Sheffield Scientific School at Yale University. Leopold inadvertently adopted the Pinchot wise-use method of forestry, as it was taught at the Yale Forest School and implemented in his fieldwork with the Forest Service. Leopold, however, was conflicted. A profession in forestry would allow him to "work with the things he enjoyed most in the places he enjoyed most"[24] but it did not necessarily coincide with his aesthetic appreciation for nature. Pinchot's utilitarian approach would promote those ideas that Leopold had himself toward conservation and wise-use, but it did not support his Muir-like attitude of preservation for nature's sake. This conflict would be the impetus of Leopold's life-long struggle to "better define the meaning of conservation."[25] While he was able to put aside his conflict in pursuit of his education, it would soon be revealed that Leopold's "own attitudes, shaped by a strong father… a rich experience of natural surroundings, and a strong inner drive, were too independent to be dominated by anyone, or by any idea."[26]

Though enthusiastic about his career opportunities in the fledgling U.S. Forestry Service, Leopold grew disenchanted with the technical aspects of forestry: "I am getting narrow as a clam with all this technical work."[27] The Pinchot doctrine had transformed the forests into statistics and dollars; but Leopold had no interest in becoming a "Tie-pickler" or "Timber-tester."[28] Rather, he was attracted to the "social benefits of forestry work" and dreamed of becoming a "supervisor on his own forest."[29]

In the summer of 1909, with a Masters of Forestry degree, Leopold took a position with the U.S. Forest Service. Leopold's initial duties as a forest assistant were to measure,

mark and survey timber and lumber mills. He grew accustomed to his duties, but also took it upon himself to pursue the establishment of a game refuge, a private undertaking that his Forest Service supervisors readily encouraged.[30] In April of 1910, Leopold was named deputy supervisor of the Carson National Forest in northern New Mexico, an area that had been utilized primarily for livestock and had been significantly overgrazed. In the Carson, Leopold encountered "probably the most heavily grazed watershed in the entire country... [where] soil erosion was gullying the range."[31] It was clear that if something were not done immediately, "the next generation... would inherit a ruined resource."[32] His duties were essentially to "clean up the range—to cancel all illegal grazing permits, [and] to chase out or take possession of illegal livestock."[33] Leopold's attempts were well-received by the Carson rangers as well as the stock owners who used the Carson lands for grazing. In 1912, Leopold was appointed supervisor of the Carson, fulfilling his college dream of having his own piece of land to manage.

In his role as supervisor, Leopold became increasingly exasperated by the amount of time required by the rangers on routine paperwork and the subsequent lack of effectiveness in the field. The Forest Service was now a fully functioning bureaucratic arm of the federal government and Leopold thought it necessary to "reemphasize the idea that a ranger's job was... to range, and not fill out forms."[34] In the July 1913 edition of the *Carson Pine Cone*, Leopold noted that the Forest Service was "entrusted with the protection and development, through wise use and constructive study, of the timber, water, forage, farm, recreative, game, fish, and esthetic resources."[35] He stressed that the "sole task [of the Forest Service] is to increase the efficiency" and that "the sole measure of... success is the *effect* [the agency has] on the forest."[36] Leopold argued "for a more democratic approach to land management," one

that assumed "those who live on, work on, and know the land" were better suited to influence and implement the policies of its use.[37] For foresters to be truly effective, according to Leopold, they had to consider each action in terms of the forest, itself. He believed that all conservation efforts should be judged solely by their effects on the totality of the land and not on their individual ends.[38]

In June 1915, after six years with the Forest Service, a frustrated Leopold transferred to a public relations position responsible for the recreational policy of the Grand Canyon, then a national monument managed by the Forest Service as part of the Kaibab National Forest.[39] When he arrived, he found the Grand Canyon to be in a state of disgrace, overrun with tourists and travel companies, with advertisements polluting the view, and unsanitary conditions resulting from excessive campers.[40] Society, in general, had become more mobile and had more wealth and leisure time. As a result, the Forest Service gave greater consideration to the public's recreational demands, particularly in the Grand Canyon with its more than 100,000 annual visitors. Leopold's new charge included managing the recreational conditions at the Canyon and handling the promotion of the Canyon as a tourist destination.[41] Leopold worked hard to stop the destruction of the Grand Canyon, echoing the words of Theodore Roosevelt: "Leave it as it is. You cannot improve on it; not a bit. ...What you can do is keep it for your children and your children's children, and for all who come after you."[42]

With the encouragement of his supervisor, Leopold diverted his attention to the establishment of refuges for such game species as deer, elk, grouse, pheasant and other species typically hunted for food, despite the fact that the federal government had not approved this idea. By July 1915, Leopold had developed the beginnings of a game

management handbook for Forest Service rangers and officers. Based on data he had collected on the status of game in the area, he predicated that game management was a necessity in the protection of national forests. Believing that the moral reasons for game management were obvious and widely supported, he chose to promote the economic benefits. In addition to monetary gains, he viewed the longevity of each species as an important economic factor: "The breeding stock must be increased. Rare species must be protected and restored. The value of game lies in its variety as well as its abundance."[43] His *Game and Fish Handbook* was published and distributed only a few months later and was praised by the Forest Service's district personnel and the national office.[44]

At the same time Leopold was turning his focus from forestry to game management, the nation was making a similar shift in the conservation movement. Many states had passed laws that aimed to protect fish, birds and other wildlife, but the laws were often not enforced. Leopold realized that the public attitude toward game protection must be drastically altered before laws could be implemented and enforced. To do so, he proposed the creation of civilian game-protection associations—an idea that was, by the end of 1915, implemented in several areas of the Southwest. Leopold was elected secretary of the Albuquerque Game Protective Association. He reactivated his old newsletter, the *Pine Cone*, this time with content aimed at his new audience—the game-protection associations—as well as foresters.[45] The goal of this new *Pine Cone*, as stated in the first issue, was to encourage an individual responsibility to the "protection and enjoyment of wild things":

> As the cone scatters the seeds of the pine and fir tree, so may it scatter the seeds of wisdom and understanding among men, to the end that every citizen may learn to hold the lives of harmless wild creatures as a public trust for human good, against the abuse of which he stands personally responsible. Thus, and only thus, will our wild life be preserved.[46]

In his first issue, Leopold published "The Varmint Question," an article he wrote calling for the cooperation of game protectionists and stockmen in the "reduction of predatory animals."[47] Leopold saw wolves, coyotes, bobcats, foxes and other predators as "varmints" responsible for the decreasing populations of game and stock (e.g. cattle). He believed that predator control was the key to revitalizing game population. What he did not anticipate was the extent to which game population would return. Efforts to eliminate predators would result in the near extermination of wolves from New Mexico. Deer populations, however, would skyrocket, and in turn, the grazers would devour the landscape. It would be years before Leopold would grasp the full consequences of extirpating a single species from an ecosystem. In "Thinking Like A Mountain," an essay he wrote decades later, he recalled a particular experience when, having shot a wolf, he watched "a fierce green fire" die in her eyes:

> I was young then, and full of trigger-itch; I thought because that fewer wolves meant more deer, that no wolves would mean hunters' paradise. But after seeing the green fire die, I sensed that neither the wolf nor the mountain agreed with such a view.[48]

In a July 1917 acceptance speech for the Permanent Wild Life Protection Fund's Gold Medal for progress, Leopold introduced a concept that he developed throughout the remainder of his life—for conservation to flourish, an ethical shift must occur with regard to man's view of nature. It was his duty, and the duty of the game-protection associations, "to educate the moral nature" of people.[49] He still recognized the hunter's place in the conservation movement and in nature—an intimation of his utilitarian roots that would continue to have a role in Leopold's thought process for sometime—but he was beginning to accept and preach the aesthetic function of wildlife. He remained committed to the idea of

restoring "to every citizen his inalienable right to know and love the wild things of his native land."[50]

In his 1918 article, "The Popular Wilderness Fallacy: An Idea That Is Fast Exploding," Leopold confronted those who saw civilization and wildlife as mutually exclusive. Leopold noted that there was a time in American history when people saw forests and civilization as mutually exclusive: "A stump was the symbol of our progress." He went on to say, "To let the public think that economic progress spells the disappearance of wildlife, is to let them believe that wildlife conservation is ultimately hopeless."[51] In this article, Leopold examined the economic activities that had precipitated unfavorable factors with regard to wildlife and illustrated how those same factors could have a positive impact if approached prudently. For example, Leopold stated, "Artificial drainage has destroyed many marshes and lakes which were formerly the feeding and breeding grounds of myriads of wildfowl. But at the same time man is building yearly hundreds of artificial lakes."[52] As well, "Overgrazing... was a powerful factor in the destruction of the antelope, mountain sheep and other range-game. But grazing ranges are coming to be dotted with thousands of artificial reservoirs for watering stock. Millions of acres of 'dry range'—waterless deserts almost devoid of life—are being made usable."[53] Similar counter arguments were made with regard to hunting, fires, agriculture and human development. His ultimate argument was such that civilization and wildlife are *not* mutually exclusive, nor can progress continue to be an excuse for destruction. "On the contrary," Leopold stated, progress "implies not only an obligation, but an opportunity for their perpetuation."[54]

Unfortunately, his efforts—and the conservation movement, in general—were superseded by the demands of World War I. Discouraged by the counterproductive activities

of wartime necessity, Leopold left the Forest Service in early 1918 for a position with the Albuquerque Chamber of Commerce. He would briefly shift his focus to encouraging "public spirit," which he defined as "intelligent unselfishness in practice" and "the new morality of the Twentieth Century."[55] In this public relations position, Leopold would concentrate on citizen activism, suggesting civic improvements such as formalized parks and native architecture.

The war had laid its demands on every resource available. Leopold's psyche was no exception. In July 1919, Leopold published his troubling moral revelation:

> The truth is, that in spite of all religion and philosophy, mankind has never acquired any real respect for the one thing in the Universe that is worth most to Mankind—namely Life. He has not even any respect for himself, as witness the thousand wars in which he has jovially slain the earth's best. Still less has he any respect for other species of animals. ...
>
> The trouble is that man's intellect has developed much faster than his morals. His machines get away from him. He is still the "Fool with a gun." His cunning mind equips him with tools whose frightful possibilities are not evident to him. ...
>
> What possible relation has all this sermonizing to such a practical thing as game conservation? Merely this, that game conservation will never succeed merely through repressive laws. It must be founded on a respect for living things. No man who would rather see a dead deer than a living one, no man who has not a profound belief in the doctrine of "Live and let live," has any right himself to live on a world so full of glorious living creatures.[56]

Further discouraged by the ineffectiveness of his position with the Chamber of Commerce, Leopold accepted an offer to return to the Forest Service. In August 1919, was given the opportunity to again manage the land he had become so familiar with over the past decade. On close examination, Leopold noticed that soil conditions within the forests were seriously deteriorating. Ninety percent of arable land had been eroded because of overgrazing and logging.[57] Leopold understood that, in geological terms, erosion was a natural process.

He also understood that much of the erosion that he had documented within the forests he was overseeing exceeded that geological timeframe.[58]

For the next few years, Leopold quietly studied the consequences of erosion while maintaining his position as Assistant Forester in Charge of Operations. During this time, he made several presentations concluding that erosion was, at least in part, a human-induced problem. More importantly, he began to pursue a holistic solution by examining the intricate relationships between the many parts of the forest—plants, animals, soils, water, etc. Erosion was not just a result of overgrazing, nor was it simply a watershed issue, as previously determined by the Forest Service. Nor was fire prevention a necessity, as had been employed by the Forest Service.[59] Leopold began to see the connection of "fire to grazing to vegetation change to erosion and realized the need to study formally those connections."[60] In December 1922, he delivered a persuasive speech, "Erosion as a Menace to the Social and Economic Future of the Southwest," in which he documented the human-accelerated process of erosion. He stated, "It is not an act of God, but the direct result of our own misuse of the country that we are trying to improve."[61] This speech revealed the direction his course of thinking was taking—a philosophical approach to conservation that called for a moral responsibility to land.

Leopold's interest in soil erosion could be attributed to his expanding approach to the natural world. In an unpublished essay, "Some Fundamentals of Conservation in the Southwest," written in 1923, he clearly examined soil erosion not as a problem in itself, but "as a symptom of an overall conservation problem."[62] This essay was also his first attempt to integrate both the philosophical and scientific aspects of the environment as a result of his observations of the deterioration of ecosystems and resources throughout the Southwest.[63]

"Some Fundamentals..." marked a turning point for Leopold as his focus on conservation shifted from a moral to an ethical perspective. For Leopold, an ethic differed from a moral in that an ethic imposed a limitation on one's freedom of action. Leopold believed that an ethical shift in man's attitude toward land—specifically, a self-imposed limitation on his freedom to work the land anyway he saw fit—was key to correcting the deteriorating conditions of the country's natural resources, as well as to ensuring their continued existence. "Some Fundamentals..." is the precursor to Leopold's most important premise: the Land Ethic.

Leopold scholar Susan Flader notes that Leopold's ethical journey began with his "concern about mountain watersheds and the problem of soil erosion."[64] Leopold tried to make foresters as well as the public aware of this ongoing and detrimental problem. He observed that there was "an overwhelming shortage of water as compared to land," "erosion and silting are likewise deteriorating our water powers," and "anything which damages the regularity of stream flow and interferes with storage of water is depreciating the value of power resources."[65] With regard to the condition of the forests and timber production, Leopold wrote, "in the long run, the timber yield will only partly suffice to sustain our own agriculture, cities and mines. Its conservation for these purposes is, of course, absolutely essential in order that we may not have to depend on expensive importation." He concluded that, as a result of these and other contributing factors, "all of our organic resources are in a rundown condition."[66]

Leopold first began to employ ethical concerns in relation to conservation issues in a subsection of "Some Fundamentals..." entitled "Conservation as a Moral Issue."[67] He found support for his evolving philosophy in the work of Russian philosopher and mystic Piotr

Ouspensky. In his progressive book, *Tertium Organum*, Ouspensky asserted that all matter was alive and therefore possessed consciousness. He regarded the Earth as a complete organism and the Earth's parts—soil, water, air, etc.—as organs with interrelated functions necessary to the health of the whole. Ouspensky observed that "life belongs not alone to separate individual organisms—anything indivisible is a living being."[68] Leopold drew heavily from this concept, endorsing the idea that each part had a "definite function" and all were part of a "coordinated whole" bearing a "delicately balanced interrelation to each other."[69] He continued, asserting that "any upsetting of this balance causes a progressive deterioration that may not only be felt hundreds of miles away, but may continue after the original disturbance is removed and affect populations and resources wholly unconnected with the original cause."[70]

"Some Fundamentals..." marked another shift in Leopold's approach to the problem of deteriorating resources in the Southwest—it was in this essay that he moved to a holistic perspective, whereby all aspects such as humans, animals, minerals, climate, water resources and uses are taken into consideration in his call for conservation. Leopold connected that "all of the remaining economic resources [mineral and organic] are of such a nature that their permanent usefulness is affected... by the idea... broadly called *conservation*."[71] He attempted to illustrate how "unskillful or nonconservative methods of exploitation threaten to limit or destroy their permanent usefulness."[72] He also began to assimilate the analytical and scientific aspects of conservation with a more philosophical approach.

Leopold realized that, in order to effectively deal with the issue of soil erosion, the entire system as a whole would have to be considered. This concept was not necessarily new to Leopold; he had been exposed to the idea of a living Earth through the writings of

Emerson, Thoreau, Muir and Whitman, among others. But at this point in Leopold's life, and specifically in this ambitious essay, Ouspensky's influence is quite clear:

> Possibly, in our intuitive perceptions, which may be truer than our science and less impeded by words than our philosophies, we realize the indivisibility of the earth—its soil, mountains, rivers, forests, climate, plants, and animals, and respect it collectively not only as a useful servant but as a living being, vastly less alive than ourselves in degree, but vastly greater than ourselves in time and space—a being that was old when the morning stars sang together, and, when the last of us has been gathered unto his fathers, will still be young.[73]

This *was* a new idea, however, for the fields of forest and game management. Realizing that this approach was most likely "too intangible to either accept or reject as a guide to human conduct," Leopold put forth a question that he thought more easy to address: "Was the Earth made for man's use, or has man merely the privilege of temporarily possessing an earth made for other and inscrutable purposes?"[74]

Prevalent views on the matter of conservation were still anthropocentric, driven primarily by scientific and religious views that placed the Earth, and all creatures thereon, under the sole proprietary of man. "Conservation as a Moral Issue" attempted to shift the concern from simply a scientific problem to a moral obligation on the part of all humans. Leopold asserted, "the privilege of possessing the earth entails the responsibility of passing it on" and that "unnecessary damage" to the earth is also damaging to the "reputation of the waster" as well as to the "society of which he is a member."[75] Leopold concluded that man should respect the soil "as a moral being respects a living thing."[76]

The final query Leopold posed in "Some Fundamentals..." would reappear in subsequent writings and speeches: If humans are "distinctive from and superior to all other life," how will this characteristic be revealed—"by a society decently respectful of its own and all other life, capable of inhabiting the earth without defiling it? Or by a society like that

of John Burroughs' potato bug, which exterminated the potato, and thereby exterminated itself?"[77]

The same year he penned "Some Fundamentals…," Leopold gave a pointed address to an Albuquerque civic society entitled "A Criticism of the Booster Spirit." In this speech, Leopold targeted what he referred to as boosterism, a purely American phenomenon and "one of the great political and economic forces of our time."[78] Boosterism was economic determinism at work, promoting exponential growth while skirting the need to establish values. Leopold accused the booster of "[w]orshipping commerce" and being "entirely out of contact with the most fundamental of his boasted resources, the soil" as well as bearing political responsibility for the state of that resource.[79] Boosters espoused growth under the veil of "Americanism" and Leopold took issue with this, stating that their actions "lead one to doubt whether the booster's hundred percent Americanism attaches itself to the country, or only to the living which we by hook or crook extract from it."[80] Leopold was dedicated to the idea of civic betterment, and argued adamantly against the economic end that was used to justify the means of resource degradation and destruction.

In the summer of 1923, Leopold was assigned to inspect the Tonto National Forest in Arizona. The Tonto was a typical Southwestern forest, exhibiting the same vegetation trends he had seen throughout the region. It also had significant signs of overgrazing and erosion. As a watershed forest, the Tonto was Leopold's opportunity to incorporate all of his ideas into one solid approach. This was also the first time Leopold—or anyone—had examined and utilized fire scars to determine their historical role within the forest.[81] The Forest Service had long promoted the idea that fire was destructive, but Leopold offered evidence to the contrary; fire was not only a natural process within the forest system, it also played a

necessary role in the maintenance of forest vegetation.[82] The Forest Service had been inclined to allow excessive grazing—and subsequent erosion—in an attempt to eliminate fire; Leopold, however, suggested that fire was necessary to preserve the health of the watershed. The Forest Service was concerned with cattle and timber production while Leopold's concern was with the entire natural system.[83] In December 1923, he completed the *Watershed Handbook*, a guide for foresters that would teach them how to identify and treat the problems of erosion.

He followed his handbook with "Grass, Brush, Timber and Fire in Southern Arizona," an essay that has since been referred to as "a landmark in ecological literature."[84] Defined as "scientific natural history," "ecology" as a field of study was still in its infancy, having emerged in the U.S. in the early 1900s, and was the first scientific examination of "the complex interrelationships between organisms and [their] environment."[85] By considering the evidence of fire scars, tree age as determined by growth rings, vegetative mosaics, erosion and human history, Leopold assembled an historical account of the region and established a systematic theory of the degradation of the watershed.[86] His theory was, again, contrary to Forest Service doctrine, and it was in need of more extensive research, but it was an "early demonstration of ecological reasoning in Leopold's work and in the literature of forestry."[87]

Leopold then took his "case for conservative land use" to the public in a 1924 article for *Sunset Magazine* entitled "Pioneers and Gullies."[88] Here he incorporated the social and economic aspects of proper land management by calling into question the custom of "pioneering, surpassing all other races in ability to reduce the wilderness to possession."[89] He stated that while we labor

> to bring new lands under irrigation... floods are tearing away... old land, much of it already irrigated, which is comparable to the new land in area and value. The opening of these great reclamation projects we celebrate... but the loss of our existing farms we dismiss as an act of God—like the storm or the earthquake, inevitable. But it is not an act of God; on the contrary, it is the direct result of our own misuse of the country we are trying to improve.[90]

Leopold noted that cooperation among and between landowners with regard to land management practices was imperative, else "the diligence of one owner [may] result merely in passing the trouble down... to his neighbors."[91] He noted that "no provision has been made to control that fundamental resource, land."[92] Leopold again endeavored to convey that the problems of overgrazing, erosion, and watershed destruction were, in fact, integrated with poor land management practices: "Natural resources are interdependent, and in semi-arid countries are often set in a hair-trigger equilibrium which is quickly upset by uncontrolled use. As a consequence, uncontrolled use of one local resource may menace the economic system of whole regions."[93] While he made a point of establishing specific remedies for individual problems and resource loss, he ultimately placed the burden of responsibility, the ethical obligation, on the landowners:

> ...the privilege of grazing use carries with it the obligation to minimize and control its effects by more skillful and conservative methods. The day will come when the ownership of land will carry with it the obligation to so use and protect it with respect to erosion that it is not a menace to other landowners and to the public.[94]

Attempting to bring about an ethical shift would prove frustrating to Leopold as he recognized it would require legislative backing in order for it to be realized.

In mid-1924, Leopold left the Southwest to assume the position of assistant director at the Forest Products Laboratory in Madison, Wisconsin. While this change in career would ultimately be limiting and somewhat unsatisfying to Leopold, the relocation would prove quite advantageous by introducing him to an area of the country where public interest in

conservation was burgeoning—and in great need. By the time of Leopold's arrival, Wisconsin's landscapes had been drastically altered; wildlife populations had been severely depleted; pollution was widespread; fires often burned out of control, consuming plants and soils in their paths.[95]

Leopold's ideas on wilderness matured during this time. He wrote many articles on the subject of wilderness while working at the Forest Products Laboratory, establishing himself as "the nation's foremost spokesman for the preservation of wild country" and sparking "a national debate over... 'the wilderness idea.'"[96] Leopold's justification for wilderness areas heretofore had primarily been for recreational purposes, but in his 1925 essay, "Wilderness as a Form of Land Use," there was again a shift in his rationale: "...wilderness is a resource, not only in the physical sense of the raw materials it contains, but also in the sense of a distinctive environment which may, if rightly used, yield certain social values."[97] He argued that Americans "[did] not yet conceive of the wilderness as a resource" because, at that time, it was seen as "unlimited... and we do not recognize anything as a resource until the demand becomes commensurable with the supply."[98] There was no demand for wilderness in and of itself.

Leopold attacked the historical "criteria of civilization... to conquer the wilderness and convert it to economic use," postulating that "the point of elimination" of America's wilderness was now on the horizon. He wrote, "…because the conquest of wilderness has produced beneficial reactions on social, political, and economic development, we have set up, more or less unconsciously, the converse assumption that the ultimate social, political, and economic development will be produced by conquering the wilderness entirely—that is, by eliminating it from our environment."[99]

Drawing again from Ouspensky and Burroughs, Leopold submitted the idea that the evolution of rational beings is self-directed, but that it "does not apply to us until we become collectively, as well as individually, rational and self-directing."[100] He challenged the self-destructive propensity of "American culture" toward pioneering and its concept of wilderness as merely "economic material," noting that man is "the first creature in all immensities of time and space... to create his own environment,"[101] and calling for "a qualitative [as opposed to economic or quantitative] conception of progress."[102] Americans, Leopold wrote, regard growth as "the number of ciphers added yearly to the national population and the national bank roll"; but from Leopold's perspective, "wilderness and economics" were "mutually exclusive."[103]

The science of conservation ecology had not yet been fully realized in the 1920s. The study of wildlife itself was still limited to the rudimentary science of animal ecology; it did not consider connections between animals and their environment.[104] Leopold's work, specifically his research directed at game management, "was the first work to examine the relationship between game and their habitat in such scope and depth."[105] His detailed examinations of game conditions began to elucidate the reliance of each part of the environment on another.

Another notable influence on Leopold was Charles Elton, Professor of Zoology at Oxford University and author of *Animal Ecology*. In his book, Elton introduced such biological concepts as trophic layers, food chains and webs, and population dynamics that would revolutionize conservation philosophy.[106] His theories were complementary to Leopold's, supporting the idea that all organisms are interdependent and any study of one should include a study of the whole habitat "since the interrelations of animals ramify so

far."[107] Elton concluded that humans had thus far been concerned only "with the effects of man upon man, disregarding often enough the other animals amongst which we live."[108] Their association would greatly contribute to Leopold's evolving ecological and moral philosophy. They would remain friends and correspondents for the rest of their lives.

Leopold had become increasingly aware that solving ecological problems required more than just correcting the mistakes made to the natural world. He could not ignore the human side of his struggle toward conservation and committed himself to reconciling the human condition with the natural world.[109] Leopold's 1933 book, *Game Management*, may have been the crowning achievement to his scientific work thus far; more so, it represented a marked transition for him, a return to his earlier philosophical methodology. With concepts akin to those expressed in "Some Fundamentals...," this work illustrated that he had moved beyond simple utilitarian conservation to a broader understanding. In the closing paragraph of *Game Management*, Leopold illustrated what he referred to as the "social significance of game management":

> In short, twenty centuries of 'progress' have brought the average citizen a vote, a national anthem, a Ford, a bank account, and a high opinion of himself, but not the capacity to live in high density without befouling and denuding his environment, nor a conviction that such capacity, rather than such density, is the true test of whether he is civilized. The practice of game management may be one of the means of developing a culture which will meet this test.[110]

In the spring of 1933, Leopold was given an opportunity to work for President Franklin Roosevelt's newly established Civilian Conservation Corps, a public work relief program that provided unskilled manual labor jobs in areas of conservation and natural resources management. Leopold's position involved supervising erosion control in the Southwest U.S. During this time, he delivered a series of addresses to various institutions along the Rio Grande, including the fourth annual John Wesley Powell Lecture in which he

formulated his idea of ethical evolution.[111] This address, entitled "The Conservation Ethic," is likely the most important address Leopold would give in his life. It would later be reworked and used in part in his most famous essay, "The Land Ethic."

Leopold concluded that ethical behavior is evolutionary. He defined an ethic, "philosophically," as "a differentiation of social and anti-social conduct."[112] A simple examination of human history revealed that as human populations increased and technologies progressed, cooperation became necessary—first, between humans individually and then between individuals and societies. The third step in this sequence of evolution was an extension of these ethics to the land in the form of a relationship between humans (society) and land (including the "non-human animals and plants which grow upon it").[113] Conservation needed to take an holistic approach, in Leopold's opinion, and not promote "parts of nature… at the expense of other parts, given nature's interconnections. It was about promoting the functioning and endurance of the whole."[114]

In this address, Leopold extended his concept of a conservation ethic, drawing parallels between past shifts in cultural attitudes (e.g. the abolition of slavery) and the present need for reformation with regard to land ownership and abuse.[115] The next logical step in the evolution of ethics would expand its reach beyond "the natural rights of a limited group of humans to the rights of… all of nature."[116] Leopold argued that "conventional moral languages have been unable to capture our proper relationship with nonhuman life, as they have been based upon an incomplete understanding of the nature of the ethical community."[117] He believed that the "complexity of the land organism" was "the outstanding scientific discovery of the twentieth century."[118]

Leopold saw the land ethic as a "restraint on humankind's capacity to modify the environment beyond levels conducive to its own survival and the biotic rights of other species."[119] He protested that the measure of progress among civilization was not "the enslavement of a stable and constant earth" but rather "a state of mutual and interdependent cooperation between human animals, other animals, plants, and soils, which may be disrupted at any moment by the failure of any of them."[120] Drawing from Elton's ecological observations, Leopold was finally able to bridge the Ouspensky-influenced holistic philosophy of "Some Fundamentals..." with present-day scientific thought. The earth *is* a living organism, held together not by metaphysical noumena, but by the "chains, flows, niches and pyramids" that existed among all levels of land and organisms.[121]

As there had been "no ethic dealing with man's relationship to land" thus far, Leopold asserted that land was historically viewed by man as mere property, an economic asset "entailing privileges but not obligations."[122] Economic expediency was the driving motivation for actions taken against or upon the land; a lack of conservation ethics to limit actions had resulted in "a progressive and mutual deterioration, not only of plants and soils, but of the animal community subsisting thereon."[123] This had been evident throughout the Southwest. Ethical conservation, however, suggested that "the destruction of land, and of the living things upon it, is wrong"[124] in the same sense that the abuse of human beings is wrong.[125] Leopold believed that a shift in cultural standards was necessary to begin to undo the human abuses of land. Economic self-interest had only resulted in destruction thus far; technology was furthering that destruction. According to Leopold, the impact of economic laws merely reflected "what people want... [and] in turn... what they know and what they are."[126] The values and ethics of landowners as well as the public would have to shift if

civilization was going to truly progress and survive. He stressed that ethics and culture must embrace the land as a member of the community before economic obstacles could be overcome. Leopold concluded this address with the simple affirmation that "a sufficiently enlightened society, by changing its wants and tolerances, can change the economic factors on land."[127]

In the summer of 1933, Leopold was offered a position with the University of Wisconsin to teach the first game management graduate program.[128] Leopold had drawn the attention of Harry Russell, the dean of the university's College of Agriculture, while working for the Forest Products Laboratory. As early as 1927, Russell began pushing for the establishment of a game management program under Leopold within the College of Agriculture, but it wasn't until 1933 that the funding for the position was secured.[129] Another Leopold supporter, Colonel Joseph Jackson, was simultaneously heading an effort to establish a university Arboretum and Wild Life Refuge, as well as a "chair of conservation" position that would serve as director of the arboretum. Jackson suggested Leopold for the position.[130] Leopold finally had an opportunity to put into practice all that he had preached.

The University of Wisconsin Arboretum was originally envisioned by John Nolen, a landscape architect and city planner, in his 1911 plan for the city of Madison and the University of Wisconsin. Nolen stated that a university "devoted largely to horticultural and agricultural interests, should naturally recognize the scientific, practical, and aesthetic value of [a] beautiful, open-air laborator[y]" to include "a good-sized arboretum, say 200 acres..."[131] In addition to serving as a natural laboratory, an arboretum would also "help protect and enhance the city's landscape." For reasons outside the scope of this paper, the plan for the Arboretum was set aside until the 1930s when Colonel Joseph Jackson secured

the necessary funds for the first land acquisition—245 acres of "postsettlement Wisconsin farmland."[132] An additional purchase the following spring brought the total to 500 acres, fully reviving the plan for the project.

John Nolen's 1911 plan for Madison and the University of Wisconsin included an arboretum. (from *Madison: A Model City* by John Nolen, 1911. Image courtesy of the UW-Madison Archives, http://digital.library.wisc.edu/1711.dl/History.NolenMadsn.)

Jackson's idea for the Arboretum included the creation of a "'chair of conservation'" position at the university, "the responsibilities of which would include serving as director of the arboretum."[133] Leopold, with his proven expertise in forestry, wilderness preservation, wildlife protection and game management, was the perfect candidate and a natural fit for this position. In 1933, he submitted a comprehensive management plan in which he stated that the Arboretum "should seek to build up the greatest possible diversity of native species to the greatest density attainable without artificial methods."[134] He suggested using historical records to determine what species should be reintroduced, emphasizing the value of food and cover plants, and established a "schedule of improvement" to aid in the determination of when to plant and for what purpose."[135] He identified necessary controls, provided a cost analysis and even proposed possible research projects such as monitoring the return of game species in relation to the improved environment. Leopold's recommendation was for the Arboretum to "be administered as a

research area for university students, a game management demonstration site, and a refuge for the region's dwindling native game species."[136]

It was during this time that Leopold began refining the ideas that would become the basis of the land ethic, whereby the "boundaries of the community" were expanded "to include soils, waters, plants, and animals, or collectively: the land."[137] The land ethic "change[d] the role of Homo sapiens from conqueror of the land-community to plain member and citizen of it... impl[ying] respect for his fellow-members."[138] Leopold posited that an ethical shift in man's attitude toward land was necessary for its recovery and continued health. He argued, however, that humans "can be ethical only in relation to something [they] can see, feel, understand, love, or otherwise have faith in."[139] Thus, the cultivation of an "ecological conscience" necessitated personal experiences in which people could connect directly with and to the land.[140]

In his essay, "Wherefore Wildlife Ecology?" Leopold stated, "Once you learn to read the land, I have no fear of what you will do to it, or with it. And I know many pleasant things it will do to you."[141] As a young boy, Leopold had immersed himself in the natural world, spending hours at a time observing the interactions between plants and animals, sketching plant parts with intricate detail, and writing about the sounds, smells and sights he encountered.[142] Through a lifetime of experiences—tramping around the Burlington countryside as young boy, seeing the "fierce green fire" in the eyes of a dying wolf as a forest ranger, sawing "the good oak" for firewood on his Sauk County property—he came to understand the language of nature, learning to read the story "spelled out" by the "alphabet of 'natural objects' (soils and rivers, birds and beasts)."[143] This personal participation as a

"fellow-member" of the land that transformed Leopold's intimate connection with the natural world into an ethical obligation to care for it.

At the dedication ceremony for the Arboretum on June 17, 1934, he told a crowd of community and university officials, “The business of a University has heretofore been conceived to be the preparation of citizens to cope *with* their environment. The University must now take on the additional function of preserving an environment fit to support citizens.”[144] Leopold had been outspoken about "the role of education relative to the problems of land" and "challenged the bedrock assumptions of formal education."[145] In "The Role of Wildlife in a Liberal Education," he argued for a different kind of education, one "that aimed to teach citizens the function of wildlife in the land organism" as opposed to simply preparing students for a vocation.[146] To this point, education had concerned itself with “preparing men to earn a salary rather than to live a life.”[147] “The objective” of liberal education, he argued, was “to teach the student to see the land, to understand what he sees, and enjoy what he understands.”[148] Leopold believed that “hands-on involvement in restoration” would inspire a “sense of personal value and reward” and would foster in students a personal land ethic by showing them firsthand how they are an active and viable member of the biotic landscape.[149]

The Arboretum essentially became Leopold’s land laboratory, or as he referred to it, “an adventure in cooperative conservation.”[150] Here, along with the help of many volunteer farmers and conservation groups, Leopold experimented with conservation practices in ecological restoration to return cultivated lands back to their historical and natural past. At the dedication ceremony, Leopold finished his address with a statement of purpose—for the Arboretum, and for his remaining life’s work: as “a reconstructed sample of old Wisconsin,

[the Arboretum] would serve as a benchmark, a starting point, in the long and laborious job of building a permanent and mutually beneficent relationship between civilized men and a civilized landscape."[151]

Leopold turned the position of research director at the Arboretum "into an opportunity to practice land restoration which he hoped would help promote 'a harmonious relationship between men and land.'"[152] He hoped the Arboretum would function as a "reconstruction of original Wisconsin," "an exhibit of what was, as well as... what ought to be."[153] The first step," he said, was "to reconstruct a sample of what we had to start with."[154] This required knowledge of what the land looked like "when our ancestors arrived" and "before we took it away" from the Native Americans.[155] Without this "visual knowledge of the land's history," Leopold believed that "a harmonious relationship between man and land" would be "impossible."[156]

The Arboretum was not Leopold's only land laboratory. In January 1935, Leopold purchased an abandoned farm on the Wisconsin River in Sauk County.[157] The trees were few and the soil spent; all that remained from the previous owner was the dug-out foundation of a farmhouse and a chicken coop with a year's accumulation of manure.[158] Leopold, however, saw an opportunity he had waited for his whole life. In a letter to his mother in 1909, he anticipated this very purchase: "I guess there is no doubt about it; I am just as much a born farmer as you are, and some day when I retire (?) I am going to own me a patch of ground and a hoe, and live the happy life..."[159] Leopold was so inspired by the restoration experiments taking place at the Arboretum, he decided he should conduct similar experiments on his own land.[160] With the initial purchase of 80 acres, the entire Leopold

clan—his wife, three sons and two daughters—became immersed in the process of ecological restoration.

His work at the Arboretum continued, and included woodland and prairie restoration experiments, which he extended to his Sauk County farm. Leopold and his family resolved to build "a little forest for ourselves," and so they planted thousands of trees and bushes. The majority of the initial plantings died due to an ongoing drought, but Leopold was not discouraged, for in failure, there was also vital information.[161] He tracked growth measurements, plant placement and tree mortality figures; he documented fluctuations in rainfall, site conditions and reactions to soil variations, mulches and fertilizers; he also noted wildlife sightings, nest locations and species interactions—both plant and animal. Subsequent planting strategies were altered necessarily.[162]

Aldo Leopold was the exemplary landowner, putting into practice the full development of his ideals. Over the years, he became increasingly attached to his own "land laboratory"; he devoted all of his free time to the reconstruction and rehabilitation of this once-barren land, practicing the same techniques that were simultaneously being implemented at the Arboretum. He lived true to his lectures—in harmony with the land: "When land does well for its owner, and the owner does well by his land; when both end up better by reason of their partnership, we have conservation."[163] By participating as a member of the land community and by fostering a mutualistic relationship with the land, Leopold illustrated the very concept he was communicating.

The Democratic Landscape—The Land Ethic Applied

Leopold recognized the potential impact—both ecologically and psychologically—of restoring an ecosystem, for it held both "aesthetic and scientific potential."[1] Leopold's belief was that restoration and conservation would "awaken in people [an] awareness and appreciation of the land and of their social responsibilities to it as community members."[2] For restoration to be truly effective beyond its functional purpose of restoring the health of the landscape, there must be a transformation "of the national attitude toward land, its life, and its products."[3]

Leopold argued that humans need "an internal change in our intellectual loyalties, affections, and convictions," a change in the "foundations of our conduct."[4] It was through direct participation with the land that he thought this change could occur. The act of restoring and conserving natural lands offers opportunities for citizens to become more fully engaged with their fellow community members, both human and nonhuman. Restoration re-connects people with the land and with each other as it promotes mutual connectivity and association with the land and all its members.

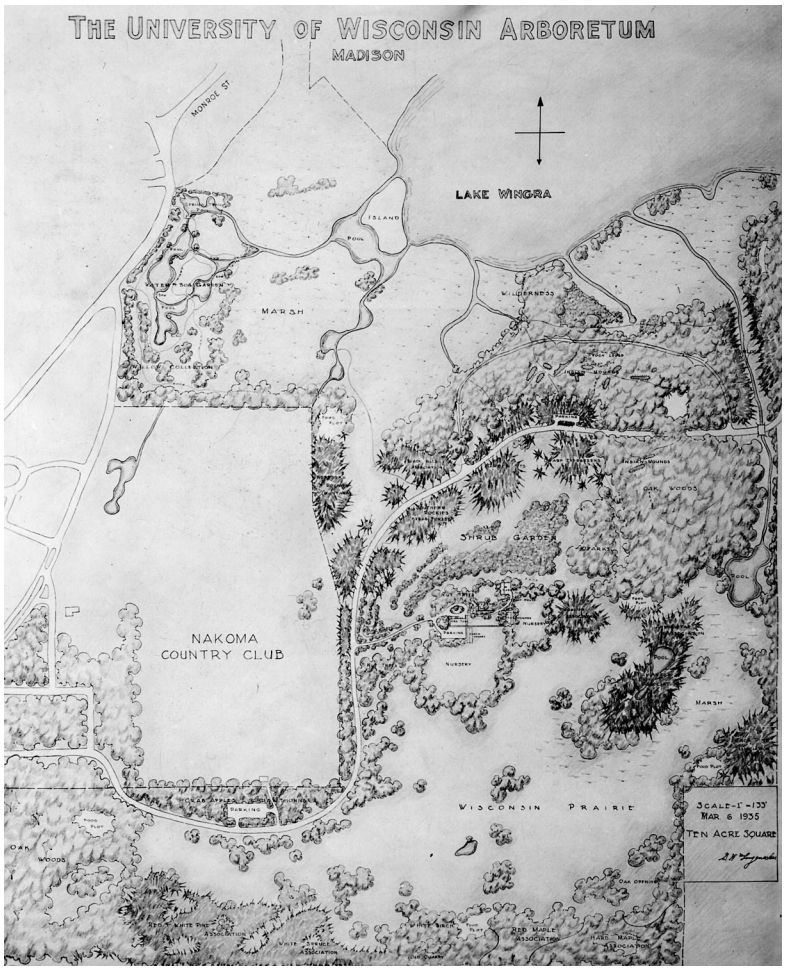
Ecological restoration is a process that involves not only ongoing maintenance, but also a continuous commitment from citizens. Restoration projects provide opportunities for regular citizen engagement. Andrew Light, Senior Fellow at the Center for American Progress, writes that these cooperative restoration projects are often "accompanied by celebrations of local communities," which can help bring a community together and encourage "the development of a community of care for nature."[5] They also tend to promote stewardship, which in turn encourages citizens to think about the landscape in a more sustainable manner.

Environmental degradation occurs when landowners are disconnected from the environment. When a landowner is not connected to the land, he or she lacks an understanding of its natural processes and requisites, which is necessary in making land use decisions that will conserve the ecological balance and not result in depleting the land of its health and resources. Engagement in the process of restoration, which provides direct participation in the physical, hands-on activities that repair and revive the landscape, will help foster "the sorts of relationships more conducive to environmental responsibility."[6] Further, when emphasized as part of the democratic process, Light argues that participation in restoration will help build within citizens "a democratic culture of nature… [and] a stronger human community that takes into account… concerns over the health, maintenance, and sustainability of larger natural systems."[7] Given the interdependence of man and nature, this consideration is of utmost importance.

The University of Wisconsin Arboretum, Madison

The idea for the University of Wisconsin Arboretum grew out of an era of marked overuse of the land. Its concept emerged after the American "frontier" had been clear cut and plowed. Leopold became convinced that "intensive agriculture was eliminating food and cover" needed by wildlife, and spoiling the soils and waters needed by both wildlife and man.[8] Through careful observation, he began to see how "unwise land-use practices generated ripple effects… through ecological communities, disrupting natural processes and reducing the land's fertility and productivity."[9] He argued that it was necessary to begin to undo the damage humans had inflicted on their environment: "Now we have realized we introduced unintentional and unnecessary changes which threaten to undermine the future

capacity of the soil to support our civilization."[10] The Arboretum would "bring back into the lives of all confronted by a dismal industrial tangle whose forces we so little comprehend, something of the grace and beauty which nature intended all to share."[11]



A map of the early Arboretum, March 1935. (Image courtesy of the UW-Madison Archives, #S07043, http://uwdc.library.wisc.edu/collections)

The Arboretum was the first large-scale foray into ecological restoration. Its function was, and is, to "provide an outdoor demonstration and research area in which native plants, animals and landscapes can be studied under natural, or nearly natural conditions."[12] Today, it continues to be "a pioneer in the restoration and management of ecological communities" as both the oldest and "most extensive… collection of restored ecosystems."[13] It also is a boon to the city of Madison as it provides recreational and restorative opportunities to the more than 225,000 people who live there.

The plan for the Arboretum established representative ecological units that would allow for the study of "ecological phenomena and to illustrate habitat."[14] The idea was to

keep the units large enough so they would become characteristic of the habitat they represent. The habitats include tall grass and short grass prairie, oak savanna, deciduous and conifer forests, wetlands, and marshes.[15] These large habitats would function as "an outdoor laboratory as an aid in teaching and research… where direct contact with nature and natural phenomena could be had."[16] With varying representative habitats came the opportunity for Leopold to collaborate with other experts such as botanist John Curtis (for which the Curtis Prairie was named) to experiment with and implement new restoration practices. They employed a number of sowing techniques—planting seeds by hand, broadcasting/spreading seeds over large areas, transplanting seedlings, etc.—and recorded the success rates of each to determine the better practice. Leopold, having learned about the importance of fire to certain ecosystems during his time in the Southwest United States, implemented a fire regimen in the Arboretum's fire-adapted habitats—oak savannas that historically required fire to maintain an open structure and prevent tree encroachment; and prairies that rely on fire to clear out unnecessary plant litter, reset the soil chemistry, and control woody plants.[17] Arboretum ecologists still prescribe burns periodically in the prairies, savannas, oak woodlands and wetlands.

Curtis Prairie with Leopold Pines in background. (Photo by the author.)

Today, the Arboretum is home to a wide range of habitat, topography, hydrology, soil and vegetation; it is also home to a myriad of Wisconsin wildlife: game birds such as wild

turkey, ruffed grouse and pheasant; non-game birds like the great blue heron, American goldfinch, Eastern bluebird, ruby-throated hummingbird and cedar waxwing; raptors such as Cooper's hawk, red-tailed hawk; and mammals like the muskrat, rabbit, squirrel, and deer—to name a few.[18] As a result, the Arboretum provides "living models… of the pre-settlement Wisconsin landscape for the study and inspiration of many students of art, literature, history, geography, hydrology, and others outside the scope of technical biological science."[19] In addition, areas such as the native plant garden as well as public classes in ecological design provide demonstrations to Wisconsin residents of how to incorporate native plants in their home landscapes. The Arboretum website provides a plant database where residents can learn about and select appropriate plants for their own projects.[20] Other activities open to the public include guided hikes and tours of the garden; presentations on the history of the Arboretum and Wisconsin's native habitats; workshops on sustainable living, plant identification, and ecological literacy; family programs; after school programs; and volunteer workdays—all designed to engage the residents of and visitors to Madison in participation with the land.[21]

The Arboretum has continued to be the "center for research on restoration" to this day.[22] Students from nearby high schools and universities come to the Arboretum to study the interactions of plants, animals and soils; to learn about horticulture and experiment with growing techniques; to investigate the effects of stormwater runoff, invasive species, and climate change on natural systems; and much more.[23]

Leopold saw civilization as the "cooperation [between] plants, animals, soil and men" and argued that a university that attempted to "define cooperation" must have a place where, "in the course of time, we will build up an exhibit of what was, as well as an exhibit of what

ought to be."[24] True to Leopold's original vision, the University of Wisconsin Arboretum has served students and community members alike in connecting and reconnecting with the land.

The Genius Preserve, Winter Park

Using Leopold's vision for the University of Wisconsin Arboretum as a model, the faculty of Rollins College, a private liberal arts college in Winter Park, Florida, engaged in partnership with the Elizabeth Morse Genius Foundation in 2002 to conduct research and restoration projects on the foundation's nearby private nature preserve. The Genius Preserve, a 45-acre remnant of "Old Florida" situated between three lakes, presented a unique opportunity to study both natural and manipulated landscapes. It also had historical value: Native Americans once settled there; an old rail line had run along its lake shore; it is the last remaining active citrus grove in Winter Park (located in the once aptly named Orange County); and it is the site of several historic homes and buildings, including the Windsong homestead, a horse stable, and an inactive citrus packinghouse.

Aerial view of the Genius Preserve in Winter Park, Florida, 2004. (from Genius Preserve website, http://www.rollins.edu/genius/)

The Genius Preserve, though much smaller in scope and size than the Arboretum, was ideal in serving as an educational starting point for the students of Rollins College's Environmental Studies program. Its mixture of natural and cultivated habitats and cultural heritage along with its proximity to the college

provided a valuable setting for research in the study and necessity of restoration and management. Through this partnership, the Genius Preserve was established as a permanent site on which research and restoration could be conducted in perpetuity. Like the Arboretum, the Genius Preserve "provide[s] the opportunity to carefully monitor change, and to experiment with restorative methods over prolonged periods."[25]

For decades, much of the Genius Preserve's natural areas had largely been ignored. In 2003, a particularly degraded section was identified and targeted for restoration. Invasive trees and vines—namely flame vine and Chinaberry, camphor and African earpod trees—which had been intentionally brought in as ornamental plantings in the 1920s by the site's original owner, had taken over, choking out many of the native species. A vegetative analysis of this two-acre site was conducted by Rollins students and faculty in order to determine what native species were historically present. Under the tangled mass of invasive species, fragments of a mesic hardwood hammock including remnant species of trees and shrubs—Southern red cedar, live oak, cabbage palm, and pignut hickory—were discovered. These, as well as Southern magnolia, laurel oak, wild coffee, coontie,

Vegetation and Land Use Map of Genius Reserve

Vegetation and land use delineations are based on Florida Land Use, Cover and Forms Classification System Handbook; Department of Transportation, Surveying and Mapping, Thematic Mapping Section, 1999.*

VEGETATIVE DELINEATION

1211 Lakeside House (0.02 ac)
1212 Wind Song House (0.25 ac)
1213 Ward House (0.07 ac)
1882 "Wagon Wheel" - Old Citrus Packing House (0.19 ac)
1891 McKean Stables (0.04 ac) (approximate)
221 Citrus Groves (5.88 ac)
2231 Banana Patch (0.18 ac)
2431 Ginger Patch (0.21 ac)
2432 Landscape Areas (3.4 ac)
2591 Plant Nursery (Old Aviary) (0.05 ac) (approximate)
427 Live Oak (2.72 ac)
4341 Longleaf Pine/Red Cedar/Magnolia Restoration Plantings (1.63 ac)
4381 Mixed Hardwoods/Landscaped Understory (13.1 ac)
4391 Mixed Hardwood Canopy with Some Disturbed Groundcover (4.46 ac)
4392 Mixed Hardwood Canopy with Dense Native Understory (6.62 ac)
4393 Mixed Hardwood/Fern Groundcover (1.42 ac)
4394 Mixed Hardwood/Regenerated Understory (0.84 ac)
4441 Mixed Exotic Plantings (Planned for Restoration) (1.47 ac)
617 Mixed Wetland Hardwoods (1.24 ac)
621 Cypress (0.81 ac)
630 Wetland Forested Mixed (2.27 ac)
641 Freshwater Marsh/Cattail (2.87 ac)
6445 Water Lily (0.5 ac)

*Recreated from a GPS-based delineation conducted by Dr. Bill Grey, Spring 2005, overlaid on a 2003 aerial photograph of the Genius Reserve.

Cedar Grove before (left) and after (right) restoration. (Photos by the author.)

and a diverse abundance of epiphytes such as orchids, ferns and bromeliads, are the components of a healthy hardwood hammock. Due to its moderately moist soil, closed canopy and dense understory, the mesic hammock is naturally protected from fire.[26]

In 2004, using historic data and FLUCFCS[27] criteria, students and faculty, along with community volunteers and professionals, developed a Comprehensive Restoration and Management Plan with the goal of restoring the "presettlement" aesthetic of the "Cedar Grove" and creating a coherent, self-sustaining and ecologically functional habitat.[28] Mesic understory species found in other "natural" (i.e. untouched) areas of the Genius Preserve—American beautyberry, wild coffee, saw palmetto, and coontie—were integrated into the restoration plan.

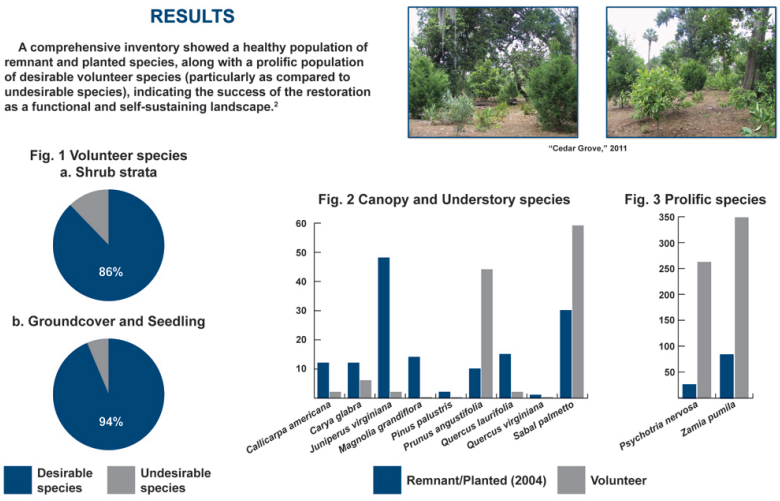
Since then, the Cedar Grove has been the site for ongoing monitoring and experimentation, providing Leopold's democratic hands-on learning opportunities. In 2006, the size of the Cedar Grove was nearly doubled with the implementation of a student-designed planting plan that would connect the mesic habitat to a restored hydric habitat located along the lakeshore. That same year, students experimented with natural herbicides in an attempt to inhibit weed growth while minimizing the use of harsh chemicals. Other student projects have included photographic monitoring, species inventory and the creation of the *Genius Preserve Field Guide* and corresponding website.[29]

Beyond the Cedar Grove, many opportunities for both restoration and research exist. Several lakefront sites and a historic banana grove have been restored using student-designed plans and incorporating native species such as bald cypress, red maple, swamp hibiscus, swamp dogwood, red bay, and Chickasaw plum that are appropriate for a more hydric environment. In 2005, an unused aviary that was overgrown with vines and weeds was transformed into a nursery. Here, students practice a variety of propagation methods such as air-layering, division, cuttings, seed collection and seedling transplantation in an effort to cultivate specimens of the same genotype of plants that are present and thriving on site. Propagation methods were employed on Simpson's stopper and swamp dogwood (air-layering); lovegrass and wiregrass (division); wild coffee, American beautyberry and anise (cuttings); coontie and coralbean (seed collection); Southern red cedar, pignut hickory and bald cypress (seedling transplantation). Students tend to the progeny until they are ready to be incorporated into a restoration. The presence of an active nursery will ensure the availability of desired plants for future projects.

In 2010, a small pollinator garden was installed using native wildflower species including firebush, dune sunflower, blanketflower, beebalm, purple coneflower and tickseed. A pollinator garden includes plants intended to attract birds, bees, butterflies and other insects that are necessary for flower pollination. It was planted and monitored by Rollins'

Meadow before (left); during installation with volunteer labor from Orange Audubon Society and neighboring community residents (center); and after (right). (Photos by the author.)

students focused on inventorying and understanding the importance of pollinator species. In 2011, approximately 4,500 square feet of fallow ground was transformed into a small “test meadow” for the purpose of attracting new pollinator species and increasing existing populations; it will also reduce the need for mowing and herbicide application in this particular area. The planting palette for the meadow incorporated the native wildflower species utilized in the pollinator garden with other native wildflowers and grasses suitable for the site such as bluestem, muhly, love and wire grasses; blazing star, spiderwort, blue curls, goldenrod, tropical sage, and blue porterweed. Seeds from both the pollinator garden and test meadow are being harvested and propagated in the nursery; the progeny will be used in the expansion of both sites. Ongoing surveys are being conducted to determine the success of attracting pollinators.



Results of 2011 ecological survey of the Cedar Grove restoration area conducted by the author. (From "Determining the Success of the Genius Preserve Cedar Grove Restoration" by Stacey Matrazzo, prepared for Natural Areas Association Conference. Fall 2011. http://www.rollins.edu/genius/images/reports/Matrazzo_Fall11.pdf.)

As a model of ecological restoration, the Genius Preserve is barely nine years old; yet it is already showing signs of success. In 2011, a study of the Cedar Grove Restoration Area was conducted in order to examine the ecological health and coherence of the site. A comprehensive inventory showed a healthy population of remnant and planted species, along with a prolific population of desirable volunteer species (particularly as compared to

undesirable species), indicating the success of the restoration as a functional and self-sustaining landscape.[30]

Despite its relatively small size, the Genius Preserve has already demonstrated its value as an ecological stepping stone for moving and migrating species. Bird species utilizing the Preserve now number over 160, with 30 nesting and breeding onsite. Rare species have been documented at the Genius Preserve including the state threatened least tern and American kestrel; the limpkin, little blue heron, osprey, snowy egret and white ibis—all state species of concern because of their low population levels; and the Townsend's solitaire, a western species never before documented in the state of Florida.[31]

The Preserve also functions as primary habitat for myriad species of amphibian, reptile and small mammal. To date, more than 50 species have been spotted at the Genius Preserve, including federally endangered gopher tortoise and federally threatened American alligator. A comprehensive fauna inventory, including insects, is ongoing, but the list of confirmed species thus far indicates that restoration and management efforts are in line with "attract[ing] ecologically appropriate species of birds and mammals."[32]

Over 280 vegetative species have been identified growing within the Genius Preserve. In the spring of 2011, a single specimen of the Florida milkvine (*Matelea floridana*), a state-listed endangered plant, was identified growing along one of the lakeside trails. Seeds were harvested and successfully propagated in the nursery. Yellow anise (*Illicium parviflorum*), a Florida endemic, state-listed endangered species, was first used in the Windsong buffer plantings; cuttings were taken and propagated in the nursery with successful specimens being used in subsequent onsite plantings. Britton's beargrass (*Nolina brittoniana*), a state- and

federally-listed endangered grass, was incorporated into the 2011 test meadow planting and is now entering its third successful flowering season.

Although the Genius Preserve is closed to the general public, opportunities for community involvement have been facilitated by Rollins College. Volunteer workdays are scheduled quarterly, offering neighbors as well as members of groups such as the Orange County Audubon Society to help with invasive removal, plantings and other onsite projects. Tours of the site are occasionally given to interested organizations such as the Florida Native Plant Society and to environmental science classes from local high schools. The Audubon Society also conducts monthly bird surveys and contributes its members' findings to the ongoing inventory.

The beauty and effectiveness of the restored landscapes are proving influential just outside the boundaries of the Genius Preserve in the adjacent luxury home development of Windsong. The property line between the Preserve and community is buffered with native trees and shrubs; this has inspired several homeowners with adjoining property lines to integrate the same native species into their landscaping plans. As well, two of Windsong's large common areas were replanted in 2011 with native species such as Southern magnolia, bald cypress, and coontie, using the Genius Preserve and Cedar Grove inventories as a model for their planting palette.

Research conducted at the Genius Preserve, as with the Arboretum, "has worldwide applicability" and encourages the development of "skills [that] are at a premium in a world where man is so often in disequilibrium with nature."[33] The long-term effects on students working on or studying at the Genius Preserve are innumerable. Students have the opportunity to gain pragmatic experience in many areas, including restoration planning and

management, plant propagation and care, botanical identification, plant associations, and invasive species management among others. Students working and conducting research at the Preserve become familiar with native plant and wildlife species and how they interact and co-exist. They develop practical skills that can be employed in and transferred to natural areas and restoration projects worldwide.

The Genius Preserve, like the University of Wisconsin Arboretum, has proven most useful as "an outdoor demonstration and research area in which native plants, animals and landscapes can be studied under natural, or nearly natural conditions."[34] A fundamental part of today's conservation education movement is the idea that "hands-on" experiences are critical to fostering a love of and respect for land. In his 1984 keynote address at the Arboretum's 50th anniversary, Peter Shaw Ashton, professor of Forestry at Harvard University, and then-director of the Arnold Arboretum, remarked that "the discipline which comes from careful observation in natural history... must come through love" and the Arboretum is "an extraordinary resource for kindling the love of nature in the young."[35] Leopold, too, believed that "young people" don't need "buildings or tracts [of land] to facilitate their contact with nature, but rather those inner qualities which enable them to enjoy nature wherever they go."[36] The Genius Preserve, through hands-on experiences, encourages in students and citizens an "awareness and appreciation of the land and their responsibilities to it as community members,"[37] aiding in the advancement of a personal land ethic and helping to "bridg[e] the gap between civilization and the natural environment."[38]

Chicago's Burnham Plan Centennial

In 2009, the Chicago Metropolitan Agency for Planning (CMAP) embarked on a centennial celebration that included a revitalized sustainable vision of Chicago that expanded on Daniel Burnham's 1909 "Plan of Chicago." Burnham recognized the need to not only reel in the 19th century initiatives of urban growth, but to also create an environment that would be sustainable and ecologically sound. He wrote, "While the keynote of the nineteenth century was expansion, we of the twentieth century find that our dominant idea is conservation."[39]

Prairie restoration in central Chicago. (Photo by the author.)

The Burnham Plan Centennial included a comprehensive plan for Chicago's lakefront and other areas that came together after a series of community panels in which regional residents were invited to participate in the overall plan for redevelopment and restoration. Citizen involvement prior to completing restoration plans allows for implementation of those features and possibilities that are important to the people who will be using these spaces. "Go To 2040" is the resulting plan and is the first plan to integrate "the use of land," "the treatment of the environment," "the movement of people and goods," and "the quality of life of the region's eight million residents."[40]

At 30 acres, the Burnham Centennial Prairie restoration project "is the largest natural area planting [the Chicago Park District has] ever done."[41] It "combin[es] the art of implementation with the science of restoration to provide a flourishing habitat that the city

will enjoy in the years to come."[42] The goal is to restore an area of mostly turf grass to its natural habitat. The Chicago Park District (CPD) will also experiment with different planting practices in order to determine what can best be utilized in future projects. The Burnham Centennial Prairie will act as a sort of "petri dish… for ecologists who will eagerly watch the land revert to natural habitat using a variety of methods."[43]

Restored prairie on Chicago's Northerly Island with city skyline in background. (Photo by the author.)

"One of the goals… is to naturalize as many areas as we can…"[44] But they also wanted to create something "a little more aesthetically pleasing" than previous restorations had accomplished.[45] This time, CPD's goal is for their "plantings and restorations to be as successful as they can be… of very high quality ecologically, and… very beautiful for the people who enjoy these areas. We understand that the more beautiful these areas are, the more opportunities we will have in the future to create projects like this."[46]

Along Chicago's Lake Michigan beachfront, plans are underway to "…transform 21 acres of the 63rd Street Beach from a trampled, trash-strewn coastline to sweeping dunes, wetlands and savanna… [The project] includes removing non-native and invasive plant species, building a 7-acre fish habitat and providing an environment for native plants to grow and thrive."[47] The dune restoration project attracted nearly 100 volunteers to help with the initial planting of grasses suitable for the intended habitat.

Northerly Island is a man-made peninsula created along the shore of Lake Michigan as part of Daniel Burnham's original 1909 "Plan of Chicago." The Northerly Island

restoration project includes “six different habitats that were [there] prior to the Chicago metropolitan area being developed.”[48] It will include new topography—hills, trees, a pond—and will present opportunities for additional activities and community engagement. For the first time, camping will be offered within the city limits, as well as a family camping program that will teach “the basic skills needed to enjoy a night under the stars.”[49]

CPD’s Family Camping Program is designed to take residents out into nature.[50] It provides opportunities for “families to come out, step away from their normal environment… [and] feel like [they are] actually out in the woods...”[51] “Most of the families that come here are first time campers” so CPD will provide everything the families need, including a sleeping bag that they can take home.[52] The goal is to encourage families to seek out camping opportunities elsewhere.

"One of the things we're trying to do at the Park District… is integrat[ing] natural areas into people's lives," said Zhanna Yermakov, the district's natural areas manager.[53] Paul Labus, Chicago Park District consultant, stated that one of the reasons he’s involved with the restoration is that

> people in urban areas don't always have a lot of access to nature. And I think that's just a sort of healthy part of our lives to have exposure to that. You can look at this strictly from a conservation standpoint… but in a lot of ways the real importance and significance of natural areas is the opportunity for the people of Chicago to reconnect with the natural history of the area.[54]

Today, “Chicago’s lakefront stands as one of the most dramatic conceptions of the ideal of the common and the activity of democratic ecological citizens in Chicago civic history.”[55]

Eden Place, Chicago

In 1996, when Michael and Amelia Howard looked across the street from their home in Fuller Park, a struggling community in the south side of Chicago, he saw an illegal garbage dump. At the time, Fuller Park was one of the most neglected neighborhoods in Chicago. It was known for its high profile gang violence, its high rate of unemployment and its low rate of literacy. For more than 35 years, vacant lots within the district had been used as dumping grounds for construction materials and other forms of noxious debris. That, in addition to its proximity to an industrial train yard and the Dan Ryan Expressway, made it the most toxic neighborhood in Chicago. The Chicago Board of Health declared it to have the highest rate of lead poisoning in the city, and third highest in the nation. Despite these horrendous numbers, the city did nothing to respond to these findings.[56]

The couple watched as the children of their community played among the toxic debris. They started to make the connection between the children's poor health and low performance in schools and the virulent conditions to which they were constantly being exposed. With the city's lack of action or concern, the Howards took it upon themselves to start the cleanup.[57]

Over the course of the next five years, the Howards rallied their neighbors in an effort to improve their circumstances. They started holding streetside workshops to educate their neighbors about the dangers of vacant lots within the neighborhood, explaining that they were full of lead, asbestos, and other contaminants left from the ruins of buildings that once stood there. With their own money, the couple began planting small butterfly gardens on Fuller Park's street corners. They funded weekly cookouts for all who showed up and

worked to remove more than 200 tons of debris from one vacant lot in particular. It wasn't until a city contractor was caught dumping on the site that the city finally took notice.[58]

By 2003, the Howards, with the help of other engaged citizens, convinced the owners of the now cleaned up lot to donate it to the community. It was here that Eden Place was born. Most everything in Eden Place was donated—the initial plants for the restoration were donated; the fence and materials for the pavilion were donated as were the benches.[59]

Eden Place was the Howards' answer to the urban challenges facing their children and the children of Fuller Park. Amelia had grown up in Fuller Park, was raised in the very house that she and Michael now raised their family. She wanted to provide the tools and education to try to make a difference and stabilize a community that she and Michael treasured so much.[60]

The mission of Eden Place is deeper than just a neighborhood clean-up and provides more than a safe place to hang out. According to Amelia, "It's about a relationship with the land, with children, trying to connect them back to something they aren't even familiar with."[61] At Eden Place, children learn about plant and animal interactions in three distinct ecosystems—a prairie, a savannah and a wetland. They also learn about the science of plants and how to grow food in the working garden. Eden Place employs teenagers from the community to help grow produce that is then sold at the farmer's market. Teens learn leadership skills and marketing. "The program," she said, "allows us to reach kids in a different way."

Fuller Park is a predominately African American community. Many of the residents took opposition to what the Howards were proposing, citing ecology as "a white people thing." But Michael Howard pushed back: "It's a human being thing. We all have to drink

the same water, we have to breathe the same air, and we have to eat the same food." The Howards believe that children (and adults) will evolve as they experience more of the land. "We are working to rebuild this community by reconnecting the people to the land," he said. "The land sustains us in ways we don't even understand."[62]

For many of the neighborhood's 4,000 residents, nature was "always something somewhere else, somewhere outside the city." The Howards sought to "re-train them that nature is everywhere to be found and they can actually have a piece of the nature they see in their minds eye right here in their community." Michael Howard uses environmental education to save lives: "I use the green in the outdoors to fight apathy, to fight poverty, to fight literacy, to fight drug abuse, racism, and indifference. Most residents here don't have much hope. We are using the environment to re-instill our residents with hope."[63]

Eden Place is a doorway to the world of nature. It is an oasis, a sanctuary in the middle of the city, and a place of refuge from everyday problems.[64]

Lower 9th Ward, New Orleans

After it was devastated by Hurricane Katrina in 2005, the Lower 9th Ward neighborhood of New Orleans became a dumping ground for construction debris, tires, household garbage, furniture, cars—even cats, dogs, and human corpses. While some of this is visible to residents, much is concealed by the jungle of vegetation that has grown tall and thick in many of the neighborhood's vacant lots—vegetation that was not there prior to the 2005 storm.[65] Seven years later, the neighborhood is overrun with fast-growing invasive plants like Southern cut grass, ragweed and Chinese tallow; an abundance of undesirable wildlife such as raccoons, opossum, armadillos, and snakes; and packs of wild dogs that were

once house pets. Neighbors have even reported sightings of coyotes and alligators. Crime, too, is rampant. Of the estimated 19,000 original residents, less than 3,000 remained or had returned by 2010.[66]

Bordered by the Mississippi River to the south and the Bayou Bienvenue Wetland Triangle to the north, the Lower 9th Ward is the only neighborhood in New Orleans with direct proximity to both, and it is very much connected to the coastal ecosystem. The Bayou Bienvenue was once a healthy cypress-tupelo swamp, but Katrina turned it into a brackish dead zone. And in the wake of the storm, 9th Ward residents, concerned more with their own health and sustenance, nearly forgot the wetland. In 2008, recognizing the critical role of wetlands in the health and well-being of the community, the Lower 9th Ward Center for Sustainable Engagement and Development (CSED) began the process of restoring the natural wetland habitat.

CSED is a grassroots non-profit organization created with the objective of restoring the Lower Ninth Ward to "a safe, environmentally just and economically vibrant community." Through community-based initiatives, the group seeks to "stimulate civic engagement, repopulate, sustain natural systems, assist community leadership and preserve resources in the Lower 9th Ward neighborhoods."[67] To further their goal of restoring the coastal habitat, CSED partnered with the University of Wisconsin to research restoration options. With the help of the University of Colorado at Denver, they installed a viewing platform on Caffin Avenue for residents to observe the wetlands and its progress. The CSED website says "…the viewing platform has played a vital role in reconnecting residents, volunteers and tourists with the Lower 9th Ward's natural surroundings."[68] CSED's

restoration initiative continues to assist in "advancing research on wetlands, environmental justice and sustainable preservation."[69]

CSED seeks to engage community members at all levels. Staffers involved with the restoration and platform are primarily 9th Ward residents.[70] Nearly 3,000 volunteers have committed over 41,000 hours to help clear vegetation, plant trees, install community gardens, restore and build homes, establish safe pedestrian and bike paths, and much more. It boasts "one of the largest ongoing volunteer efforts in post-Katrina New Orleans."

It is the goal of the community to reconnect the neighborhood to the ecosystem. Rev. Willie Calhoun, resident and president of the Lower 9th Ward School Coalition, stated, "We have to ban together to start looking at protection for this area because without the proper protection, we stand to lose more than we even know—the connection with the water, the seafood industry, and all those things that associate our livelihood to this area. Something is wrong if we're not bringing it all back together."[71] Lower 9th Ward resident Sarah de Bacher supports the restoration because "the wetlands are not only the first line—even second line—of defense, they also contribute to the culture and community."[72] John Taylor, resident and bayou specialist for CSED, argues, "This is what's happening now. This has to change. We have to love what is keeping us alive… We can't live anywhere else [other than earth]… so we've got to do something."[73]

Although progress is slow, through community engagement in the restoration of both the natural and built environments, the Lower 9th Ward is experiencing a renewed sense of community. New businesses have moved in, schools and churches have reopened, gardens have replaced overgrown vacant lots, and people are seeing their vision of a strong, sustainable community flourish.

Conclusion

That humans and nature are interconnected and interdependent is an incontrovertible fact. Humans do not and cannot exist in isolation; nor can the soils, plants, animals or other members of the biotic community. All are interconnected and dependent in one way or another upon the other members for survival. Environmental historian Donald Worster writes,

> There is no precedent in the natural community… for one species to set itself up as an independent, sovereign, kingdom. The idea of man's autarchy can be only a delusion… Once they accept the simple fact of interdependence, men and women can be taught to practice a life-revering ethic such as Aldo Leopold's community citizenship—a close, worldwide relationship between mankind and his biological kin.[1]

Aldo Leopold's land ethic is a communitarian call to action, one that seeks to restore not only the natural environment, but also the civic spirit of man as an undeniable member of the biotic community.

The evolution of Leopold's personal attitude toward nature was an assimilation of his life experiences: his childhood appreciation of nature and the strong ethics imposed upon him from his father and grandfather; his utilitarian career in forestry; his instinctive understanding of the holistic relation between soil erosion, watersheds and game management; and ultimately, his ethical transformation. He redefined the meaning of land, expanding it to encompass the soil, water, minerals, plants and non-human animals. He challenged the common notion of land as an economic commodity, and the individualism of the American pioneering way of life. With sound, historical evidence and scientific reasoning, Leopold brought forth a profound ecological conscience that would inspire many to further his new goal: to encourage an ethical transformation of human attitudes toward the land.

Leopold both demonstrated and argued that participation as a member of the biotic community is necessary to encourage actions guided by a moral sense of responsibility for the land and fellow land members. When humans are connected to the land, when they become aware of their place within the natural community, and when they begin to see themselves as members of that community, they will feel more accountable for its care and well-being. If land-use decisions are to be made democratically, an "active moral concern for place" is imperative.[2]

To advance toward a civilized, democratic landscape requires humans to view their actions toward the land as a moral undertaking. A truly democratic landscape necessitates the development of informed and engaged citizens working toward a common ecological and social good. A nation of "democratic ecological citizens" will ensure "that nature continue[s] to flourish and that it can be an integral, valued part of the human experience…"[3]

Humans cannot continue their shortsighted, individualistic pursuits. Rather, their actions must be guided by a moral sense of responsibility for fellow land members. They must be motivated by an understanding of what is morally right for the whole of the land; otherwise, actions carried out upon the land will not reflect the good of the whole. The American democratic system fails all land members when it tends to favor the good of an individual over the good of the community.

A democratic landscape, one that includes and considers all members of the land community, is the only hope for democracy. Active participation from all able members is necessary, as is the reframing of environmental protections, not as prohibitive of individual rights (to despoil community resources, for example) but as necessary to individual—and subsequently societal—health and happiness. Humans must move toward an integration of

land and social ethics to establish one vision of ethical consideration that unifies man and the land. Not until they accept the social responsibility to each other, to all members of the land community, will they experience and benefit from a true democracy.

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